

INFORMATION PROCESSING APPARATUS,  
INFORMATION PROCESSING SYSTEM,  
INFORMATION PROCESSING METHOD, AND  
STORAGE MEDIUM THEREFOR

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BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to an information  
processing technique, and in particular, relates to a  
10 technique for processing content data.

Related Background Art

While use of the Internet is now widespread,  
because of unauthorized copying or alteration of  
photograph data or music data, conventionally there are  
15 few cases wherein the Internet has been used by  
photograph or music agencies to sell photograph or  
music data. For even if photograph data were sold, it  
would be very expensive, over a million yen per photo,  
for example, and although the Internet has been used  
20 for music transactions, the quality of the data handled  
in this manner tends to be lower than that of original  
recordings.

Logically, it can be anticipated that high  
resolution data prepared from a photograph will have an  
25 initial high cost; to acquire the necessary image data,  
special film scanners must be used and several  
megabytes of image data are needed to reproduce even a

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small photo.

Furthermore, a basic characteristic of photograph  
or music data is that they suffer no deterioration over  
time, and that the number of images that can be  
5 displayed and the number of musical pieces that can be  
reproduced is theoretically infinite.

Therefore, since digital content data is  
susceptible to repetitive copying, and since copies can  
be used to display photographs or to play music  
10 innumerable times, one of the main reasons digital  
content data is expensive is the risk posed by the  
unauthorized use of copies. This risk also makes it  
currently impractical for photography and music  
agencies to vend digital content data over the  
15 internet. Finally, although the use of home personal  
computers to sell photograph and music data has been  
the topic of much recent discussion, as of now, it is  
difficult to view such sales as an established means of  
marketing.

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#### SUMMARY OF THE INVENTION

It is a first objective of the present invention  
to limit the frequency whereat a user can display or  
reproduce digital content data, such as photograph data  
25 or music data, and instead, to reduce the price of such  
digital content data and accelerate its sale via the  
Internet. Further, according to the invention,

limitations imposed on the frequency at which data can be displayed and reproduced will be effective even when the copying of digital data is permitted.

It is a second objective of the present invention  
5 to achieve the first objective in a practical manner by  
using a peripheral device connected to a user's  
personal computer.

According to one aspect of the invention, an information processing apparatus comprises:

10        encryption means, for encrypting a life counter for content data;

addition means, for adding the encrypted life counter to a content data file; and

transmission means, for externally transmitting,  
15 via a network, the content data file having the added  
life counter.

According to one more aspect of the invention, an information processing apparatus comprises:

reception means, for externally receiving, via a  
20 network, a content data file to which an encrypted life  
counter has been added;

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processing means, for processing the content data
file;
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subtraction means, for subtracting a specific  
25 value from the encrypted life counter; and

control means, for inhibiting the processing means  
from processing the content data file when the value

held by the encrypted life counter has been reduced to a value smaller than the specific value.

According to another aspect of the invention, an information processing system is provided whereby a  
5 first information processing apparatus and a second information processing apparatus are interconnected, wherein the first information apparatus comprises:

encryption means, for encrypting a life counter for content data,

10 addition means, for adding the encrypted life counter to a content data file, and

transmission means, for transmitting, via a network, the content data file having the added life counter to the second information apparatus; and

15 wherein the second information processing apparatus comprises:

reception means, for receiving, via a network, from the first information processing apparatus a content data file to which an encrypted life counter  
20 has been added,

processing means, for processing the content data file,

subtraction means, for subtracting a specific value from the encrypted life counter, and

25 control means, for inhibiting the processing means from processing the content data file when the value held by the encrypted life counter has been reduced to

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a number smaller than the specific value.

According to an additional aspect of the invention, an information processing apparatus comprises:

5           data transmission means, for externally transmitting, via a network, a content data file;

          life counter transmission means, for externally transmitting, via the network, a life counter for the content data file; and

10           program transmission means, for externally transmitting, via the network, an application program file for processing the content data file.

According to a further aspect of the invention, an information processing apparatus comprises:

15           data reception means, for receiving, via a network, a content data file;

          life counter reception means, for receiving, via the network, a life counter for the content data file;

          program reception means, for receiving, via the network, an application program file for processing the content data file;

          encryption means, for encrypting the life counter;

          addition means, for adding the encrypted life counter to the content data file;

25           transmission means, for transmitting, via the network, the application program file to a different information processing apparatus; and

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control means, for permitting the reading only of the content data file for an application program that is currently being executed by the different information processing apparatus.

5       According to yet one more aspect of the invention, an information processing apparatus comprises:

reception means, for receiving, via a network, an application program file for processing content data from a different information processing apparatus;

10       processing means, for executing, via the network, the application program for processing content data stored in the different information processing apparatus;

15       subtraction means, for subtracting, via the network, a specific value from a life counter for the content data stored in the different information processing apparatus each time the content data file is processed; and

20       control means, for inhibiting the processing means from processing content data when the value held by the encrypted life counter has been reduced to a value smaller than the specific value.

25       According to yet another aspect of the invention, an information processing system is provided whereby a first information processing apparatus, a second information processing apparatus and a third information processing apparatus are interconnected,

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data transmission means, for transmitting, via a network, a content data file to the second information processing apparatus,

program transmission means, for transmitting, via the network, an application program file for processing the content data file to the second information processing apparatus;

data reception means, for receiving, via the network, the content data file from the first information apparatus,

program reception means, for receiving, via the network, an application program file for processing the content data file from the first information processing apparatus,

encryption means, for encrypting the life counter,  
addition means, for adding the encrypted life

transmission means, for transmitting, via the network, the application program file to the third information processing apparatus, and

control means for permitting the reading of the content data file only for an application program that is currently being executed by the third information processing apparatus; and

wherein the third information processing apparatus comprises:

reception means, for receiving, via the network,  
an application program file for processing content data  
received from the second information processing  
apparatus,

processing means, for executing, via the network,  
the application program for processing content data  
stored in the second information processing apparatus;

subtraction means, for subtracting, via the network, a specific value from a life counter for the content data stored in the different information processing apparatus each time the content data file is processed, and

control means, for inhibiting the processing means from processing content data when the value held by the encrypted life counter has been reduced a value smaller than the specific value.

According to yet an additional aspect of the



invention, an information processing method comprises the steps of:

- (a) encrypting a life counter for content data;
- (b) adding the encrypted life counter to a
- 5 content data file; and
- (c) for externally transmitting, via a network, the content data file having the added life counter.

According to yet a further aspect of the invention, an information processing method comprises the steps of:

- (a) externally receiving, via a network, a content data file to which an encrypted life counter has been added;
- (b) processing the content data file;
- 15 (c) subtracting a specific value from the encrypted life counter; and
- (d) inhibiting the step (b) for processing the content data file when the value held by the encrypted life counter has been reduced to a value smaller than
- 20 the specific value.

According to yet one further aspect of the invention, an information processing method comprises the steps of:

- 25 (a) externally transmitting, via a network, a content data file;
- (b) externally transmitting, via the network, a life counter for the content data file; and

(c) externally transmitting, via the network, an application program file for processing the content data file.

According to still one more aspect of the invention, an information processing method comprises the steps of:

(a) receiving, via a network, a content data file;

(b) receiving, via the network, a life counter for the content data file;

(c) receiving, via the network, an application program file for processing the content data file;

(d) encrypting the life counter;

(e) adding the encrypted life counter to the content data file;

(f) transmitting, via the network, the application program file to a different information processing apparatus; and

(g) permitting the reading only of the content data file for an application program that is currently being executed by the different information processing apparatus.

According to still another aspect of the invention, an information processing method comprises the steps of:

(a) receiving, via a network, an application program file for processing content data from a

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different information processing apparatus;

(b) executing, via the network, the application program for processing content data stored in the different information processing apparatus;

5 (c) subtracting, via the network, a specific value from a life counter for the content data stored in the different information processing apparatus each time the content data file is processed; and

10 (d) inhibiting the step (b) for processing content data when the value held by the encrypted life counter has been reduced to a value smaller than the specific value.

15 According to still an additional aspect of the invention, a computer-readable storage medium is provided on which a program is stored that permits a computer to perform:

(a) a process for encrypting a life counter for content data;

20 (b) a process for adding the encrypted life counter to a content data file; and

(c) a process for externally transmitting, via a network, the content data file having the added life counter.

25 According to still a further aspect of the invention, a computer-readable storage medium is provided on which a program is stored that permits a computer to perform:

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(a) a process for externally receiving, via a network, a content data file to which an encrypted life counter has been added;

5 (b) a process for processing the content data file;

(c) a process subtracting a specific value from the encrypted life counter; and

10 (d) a process for inhibiting the step (b) for processing the content data file when the value held by the encrypted life counter has been reduced to a value smaller than the specific value.

15 According to again one more aspect of the invention, a computer-readable storage medium is provided on which a program is stored that permits a computer to perform:

(a) a process for externally transmitting, via a network, a content data file;

20 (b) a process for externally transmitting, via the network, a life counter for the content data file; and

(c) a process for externally transmitting, via the network, an application program file for processing the content data file.

25 According to again another aspect of the invention, a computer-readable storage medium is provided on which a program is stored that permits a computer to perform:

(a) a process for receiving, via a network, a content data file;

(b) a process for receiving, via the network, a life counter for the content data file;

5 (c) a process for receiving, via the network, an application program file for processing the content data file;

(d) a process for encrypting the life counter;

10 (e) adding the encrypted life counter to the content data file;

(f) a process for transmitting, via the network, the application program file to a different information processing apparatus; and

15 (g) a process for permitting the reading only of the content data file for an application program that is currently being executed by the different information processing apparatus.

According to again an additional aspect of the invention, a computer-readable storage medium is  
20 provided on which a program is stored that permits a computer to perform:

(a) a process for receiving, via a network, an application program file for processing content data from a different information processing apparatus;

25 (b) a process for executing, via the network, the application program for processing content data stored in the different information processing apparatus;

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(c) a process for subtracting, via the network, a specific value from a life counter for the content data stored in the different information processing apparatus each time the content data file is processed;  
5 and

(d) a process for inhibiting the step (b) for processing content data when the value held by the encrypted life counter has been reduced to a value smaller than the specific value.

10 According to the present invention, a life counter is added to content data, and the value held by the life counter is reduced in accordance with the frequency the content data, which may be either photograph data or music data, is displayed or printed  
15 or is reproduced, or in accordance with a reproduction period. When the value held by the life counter has been reduced a number smaller than a predetermined value, the display, printing or reproduction of the content data is inhibited. And since the life counter  
20 is encrypted before it is added to the content data, a user can not increase the value held by the life counter without permission.

#### BRIEF DESCRIPTION OF THE DRAWINGS

25 Fig. 1 is a first explanatory diagram showing the principle of a first embodiment of the present invention;

Fig. 2 is a second explanatory diagram showing the principle of the first embodiment of the present invention;

Fig. 3 is a block diagram showing the  
5 configuration of a user's personal computer;

Fig. 4 is a flowchart for explaining the operation of a file manager;

Fig. 5 is a flowchart for explaining the operation of a photograph display application;

10            Fig. 6 is a flowchart for explaining the operation  
of a music reproduction application;

Fig. 7 is a explanatory diagram showing the principle of a second embodiment of the present invention;

15            Fig. 8 is a block diagram showing the  
configuration of a user's personal computer;

Fig. 9 is a block diagram showing the configuration of a printer;

Fig. 10 is a flowchart for explaining the  
20 operation of a photograph data/music data purchase  
instruction program;

Fig. 11 is a flowchart for explaining the operation of a photograph display application;

Fig. 12 is a flowchart for explaining the  
25 operation of a music reproduction application;

Fig. 13 is a flowchart for explaining the operation of a program file/data file reception

program; and

Fig. 14 is a flowchart for explaining the operation of a photograph data printing program.

5 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The preferred embodiments of the present invention will now be described while referring to the accompanying drawings.

<First Embodiment>

10 Fig. 1 is a first explanatory diagram of the principle of an information processing system according to a first embodiment of the present invention, and shows the general processing performed when contact data is purchased via the Internet.

15 First, the components of the system will be described. The information processing system comprises a web server 1, used by a photograph agency or a music agency, and a user's personal computer 2. The user's personal computer 2 includes an Internet connection  
20 function.

A user employs the user's personal computer 2 to connect to the web server 1 of the photograph agency or the music agency via the Internet, and desires to purchase photograph data or music data. At this time,  
25 the credit card number of the user is transmitted, by the user, to the web server 1. Then, the photograph data or the music data is transmitted to the user's



personal computer 2, and is stored as a photograph data  
file 34 or a music data file 35 in an external storage  
device 29 of the user's personal computer 2. When the  
transmission of the data file has been completed, based  
5 on the credit card number of the user, the web server 1  
charges a fee for the content data, such as photograph  
data or music data.

Fig. 2 is a second explanatory diagram of the  
principle of the information processing system  
10 according to the embodiment of the present invention,  
and is used to explain the operation of the user's  
personal computer 2 of this embodiment. The user's  
personal computer 2 includes a file manager 31, a  
photograph display application 32 and a music  
15 reproduction application 33, in addition to the  
photograph data file 34 and the music data file 35.

The photograph data file 34 or the music data file  
35, which are purchased via the Internet and stored in  
the external storage device 29 of the user's personal  
20 computer 2, includes data for a main data portion 36  
and an encrypted life counter 37.

The data in the photograph data file 34 are used  
by the photograph display application 32 to prepare a  
photograph for display, and each time the data are thus  
25 employed, the photograph display application 32  
decrements, by one, the value held by the relevant life  
counter 37. Then, when the value held by the relevant

life counter 37 has been decremented until it is less than 1, as a result of the repetitive display of the photograph, the data in the photograph data file 34 can no longer be used by the photograph display application 32 to display the photograph.

Similarly, the data in the music data file 35 are used by the music display application 33 to prepare music for reproduction, and each time the data are thus employed, the music display application 33 decrements, by one, the value held by the relevant life counter 37. Then, when the value held by the relevant life counter 37 has been decremented until it is less than 1, as a result of the repetitive reproduction of music, the data in the music data file 35 can no longer be used by the music display application 33 to reproduce the music.

Further, when the file manager 31 makes a copy of the photograph data file 34 or the music data file 35, the values held by the life counters 37 of both the source file that is copied and the destination file are reduced by half. That is, the final, total value held by the two life counters 37 is the same as that held by the life counter 37 of the source file at the time the copy was made. And when a file is moved by the file manager 31, the value held by the life counter 37 at the new location is the same as that it held at the time the move was initiated.

In the above description, the value held by a life counter 37 is determined in correlation with the display or reproduction frequency; however, when the content data is for music or video, the life counter 37 may be correlated with a reproduction time. For example, when the initial value held by a life counter 37 for music data is "five hours", and when a user has employed the music reproduction application 33 to reproduce music for thirty minutes, the value held by the life counter for the music data will be decremented by "thirty minutes" and will be reset to "four hours and thirty minutes". And when, by the repetitive reproduction of the music the value held by the life counter has been reduced until "0 minutes" is reached, at that time, further reproduction will be inhibited. In addition, during a copying operation performed by the file manager 31, the same condition will still apply, that the life counters 37 of the source file that is copied and the destination file will each be reduced by half. Further, a video data file may be employed in the same manner as is a music data file 35, and in this case, a video reproduction application will reproduce the data in a video data file and will control the value held by a life counter 37.

Fig. 3 is a block diagram showing the configuration of the user's personal computer 2.

A central processing unit (hereinafter referred to

as a "CPU") 21 provides overall control for the personal computer 2, and an operating system program (hereinafter referred to as an "OS"), which controls all the operations performed by the personal computer 2, and display fonts are stored in a read only memory (hereinafter referred to as a "ROM") 22.

A random access memory (hereinafter referred to as a "RAM") 23 is used to hold various programs, stored in the external storage device 29, that are loaded into it for execution, and is also used as a work area for the OS or other programs that are executed.

In the state in Fig. 3, a program in a program file group has been loaded from the external storage device 29 to the RAM 23, and the file manager 31, the photograph display application 32 and the music reproduction application 33 are currently being employed. While the file manager 31 is part of the OS, a part of the OS is also included in the program file group of the external storage device 29.

A data file group is also stored in the external storage device 29, and the photograph data file 34 and the music data file 35 are included in this group.

A speaker 24 is used to reproduce music or other sounds, a CRT 25 is a display device for the user's personal computer 2, a keyboard 26 is used as a character entry device, and a mouse 27 is used as a pointing device.

An Internet connection unit 28 is used for effecting a connection with the web server 1, which belongs to a photograph agency or a music agency.

5 The operation of the information processing system for the first embodiment of the present invention will now be described while referring to flowcharts.

10 Fig. 4 is a flowchart for explaining the processing performed by the file manager 31 of the user's personal computer 2. This program is activated by the user.

First, at step S1 a check is performed to determine whether the user has turned off the personal computer 2 or has issued a program end instruction. If the decision is YES, the program is terminated.

15 When the decision at step S1 is NO, at step S2 a check is performed to determine whether the user has issued an instruction for the movement of a file. If the decision at step S2 is YES, at step S3 the movement of the file is performed, and thereafter, program control returns to a position immediately preceding step S1 and loops while waiting for the next instruction to be issued by the user.

25 When the decision at step S2 is NO, at step S4, a check is performed to determine whether the user has issued a file copy instruction. If the decision at step S4 is YES, at step S5 a check is performed to determine whether the source file that is copied is a

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performed. In this case, the "other file operations" include the display of detailed information for a file.

Following step S13, or when the decision at step S12 is NO, program control returns to a position immediately preceding step S1 and loops while waiting for the next instruction to be issued by the user.

Fig. 5 is a flowchart for explaining the processing performed by the photograph display application 32 of the user's personal computer 2. This program is activated upon the receipt of an instruction by a user.

First, at step S21 a check is performed to determine whether the user has issued an end instruction. If the decision is YES, the program is terminated. But if the decision is NO, at step S22 a check is performed to determine whether the user has issued a photograph data file display instruction. If the decision is YES, at step S23 a check is performed to determine whether the data file is one that includes a life counter. When the decision is YES, at step S24 the encrypted life counter is decrypted and at step S25 the value held by the life counter is decremented by one. Then, at step S26 the life counter is encrypted and at step S27 is again written into the photograph data file. Following this, at step S28, the data in the photograph data file is used to display a photograph.

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When the decision at step S23 is NO, program control jumps to step S28 and the photograph data is used to perform a simple process for the display of a photograph.

5       Following step S28, or when the decision at step S22 is NO, program control returns to a position immediately preceding step S21 and loops while waiting for the next instruction to be issued by the user.

10       During this processing, the decrementing of the value held by a life counter has been performed before photograph data was used to display a photograph; however, the value held by a life counter may normally be decremented afterwards.

15       Fig. 6 is a flowchart for explaining the processing performed by the music reproduction application 33 of the user's personal computer 2. This program is activated upon the receipt of an instruction from a user.

20       First, at step S31 a check is performed to determine whether the user has issued an end instruction. If the decision is YES, the program is terminated. But if the decision is NO, at step S32 a check is performed to determine whether the user has issued a music data file reproduction instruction. If  
25       the decision is YES, at step S33 a check is performed to determine whether the data file is one that includes a life counter. When the decision is YES, at step S34

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the encrypted life counter is decrypted, and at step  
S35 the value held by the life counter is decremented  
by one. Then, at step S36 the life counter is  
encrypted and at step S37 is again written into the  
5 music data file. Following this, at step S38, the data  
in the music data file is used to reproduce the music.

When the decision at step S33 is NO, program  
control jumps to step S38 and the music data is used to  
perform a simple process for the reproduction of the  
10 music.

Following step S38, or when the decision at step  
S32 is NO, program control returns to a position  
immediately preceding step S31 and loops while waiting  
for the next instruction to be issued by the user.

15 During this processing, the value held by the life  
counter is determined in correlation with the frequency  
at which music is reproduced; however, the value held  
by the life counter may also be determined in  
correlation with music reproduction time. For example,  
20 if at the time of sale the initial value held by a  
music data file life counter is three hours, when as a  
result of repetitively reproducing the music the  
cumulative time used reaches three hours, further  
reproduction of the music is inhibited.

25 During this processing, the decrementing of the  
value held by a life counter has been performed before  
the reproduction of music data; however, the value held

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by the life counter may be decremented after the music data has been normally reproduced.

<Effects in the first embodiment>

In this embodiment, to limit the frequency at  
5 which a photograph is displayed or music is reproduced,  
a life counter is added to a photograph data file or a  
music data file, and each time the photograph is  
displayed or the music is reproduced, the value held by  
the life counter is decremented by one. Thus, the  
10 price of the photograph data or music data can be  
reduced.

Then, since the prices of photograph data and  
music data can be reduced, photograph data and music  
data can more easily be sold to users of home personal  
15 computers via the Internet.

Further, when copying a photograph data file or a  
music data file, the values held by the life counters  
of the source file that is copied and the destination  
file will each be reduced by half, so that the total  
20 value held by the life counters is unchanged. That is,  
the total frequency for the display of a picture or the  
reproduction of music is unchanged, even after a  
copying operation has been performed. As is described  
above, since a copying operation can be performed when  
25 the copy frequency is limited, this provision is  
convenient for users.

In this embodiment, for a music data file, time

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5      <Second Embodiment>

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printer. The second embodiment will now be described while referring to the drawings.

Fig. 7 is a diagram for explaining the principle of an information processing system according to the second embodiment, and for showing the processing performed when content data, such as photograph data and music data, is purchased via the Internet.

First, the components of the information processing system will be described. The information processing system comprises: a web server 1, belonging to an entity such as a photograph agency or a music agency; a user's personal computer 2; and a printer 3, connected to the user's personal computer 2. The printer 3 includes an Internet connection function, and a hard disk (hereinafter referred to as an HD) 51, which is an incorporated, external storage device.

First, via the Internet, a user connects the personal computer 2 to the web server 1, belonging to an entity such as a photograph agency or a music agency. Then, for the selection of a photograph, thumbnail images, prepared using photograph data, are received and displayed on the CRT of the personal computer 2, and the user scans the images to determine which photograph data to purchase; or for the selection of music, a list of music data is received and displayed on the CRT of the personal computer 2, and the user scans the list to determine which music data

to purchase. Once a decision has been made, user disconnects the computer 2 from the Internet.

Thereafter, the user instructs the printer 3, which is connected to the personal computer 2, to  
5 purchase the selected photograph data or music data, and also transmits to the printer 3 the credit card number that is to be used. The printer 3 is then connected, via the Internet, with the web server 1, belonging to the photograph agency or the music agency,  
10 and it transmits to the web server 1, as instructed by the user, a purchase request for the selected photograph data or music data and the credit card number. Subsequently, the printer 3 receives from the web server 1 the photograph data or music data and  
15 stores the content data in a data file 54 or 55 on the hard disk 51, the incorporated external storage device. Since the data for the life counter is received at the same time from the web server 1, the life counter is encrypted and the encrypted life counter is written to  
20 the photograph data file 54 or the music data file 55.

In addition, if a photograph display application program file 52 is not stored in the external storage device 51 of the printer 3, immediately after the content data for the photograph data file 54 is  
25 received a photograph display application program file 52 is also received and stored in the external storage device 51; or if a music reproduction application

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copying function, however, the user can not fetch the photograph data file 54 or the music data file 55 from the external storage device 51 of the printer 3 and store it in the personal computer 2.

Fig. 8 is a block diagram showing the configuration of the user's personal computer 2.

A central processing unit (hereinafter referred to as a "CPU") 21 provides overall control for the personal computer 2, and an operating system program (hereinafter referred to as an "OS"), which controls all the operations performed by the personal computer 2, and display fonts are stored in a read only memory (hereinafter referred to as a "ROM") 22.

A random access memory (hereinafter referred to as a "RAM") 23 is used to hold various programs, stored in an external storage device 29, that are loaded into it for execution, and is also used as a work area for the OS or other programs that are executed.

In the state shown in Fig. 8, various programs in  
a program file group stored in the external storage  
device 29 have been loaded into the RAM 23, and the  
file manager 31, an Internet browser 71, a photograph  
data/music data purchase instruction program 72, the  
photograph display application 52 and the music  
reproduction application 53 are currently being  
executed. While the file manager 31 belongs to the OS,  
one part of the OS is also included in the program file

group stored in the external storage device 29.

A speaker 24 is used to reproduce music or other sounds, a CRT 25 is a display device for the user's personal computer 2, a keyboard 26 is used as a  
5 character entry device, and a mouse 27 is used as a pointing device.

An Internet connection unit 28 is used for connection to the web server 1, belonging to the photograph agency or the music agency. A network  
10 connection unit 30 is used to connect the personal computer 2 to the printer 3, which is a peripheral device to which print command data is transmitted via the network. Further, either the photograph display application program file 52 or the music reproduction  
15 program file 53, both of which are stored in the external storage device 51 of the printer 3, is referred to by the personal computer 2 via the network, and is downloaded into the external storage device 29 of the personal computer 2.

20 A program file group and a data file group are stored in the external storage device 29, and as was previously described, the program file group includes a program file for the file manager 31, a program file for the Internet browser 71, the photograph data/music  
25 data purchase instruction program file 72, the photograph display application program 52, and the music reproduction application program 53. The data

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file group also includes data files used for the various program files.

Fig. 9 is a block diagram showing the configuration of the printer 3.

5           The printer 3 is mainly constituted by a  
controller 41 and an engine unit 61. The controller 41  
generates a sheet image for each page based on print  
command data received from the user's personal computer  
2, converts the image into a video signal, and  
0 transmits the video signal to the engine unit 61. Upon  
the receipt of the video signal, the engine unit 61  
transfers the image to a sheet, fixes the image  
thereon, and discharges the sheet from the printer 3.

The controller 41 will now be described in detail.

15 A central processing unit (hereinafter referred to as a CPU) 42 provides overall control for the controller 41, and in a read only memory (hereinafter referred to as a ROM) 43, various programs are stored that are used to control the functions performed by the controller 41.

20 These programs are mainly a receiving program, a command analyzing program, an output program, a program file/data file receiving program and a photograph data printing program.

25 Via a network connection unit 45, the receiving program stores in a receiving buffer 47 in a random access memory (hereinafter referred to as a RAM) 44 print command data that are received from the user's

personal computer 2. The command analyzing program analyzes a print command stored in the receiving buffer 47 and draws an image in a frame memory 48 in the RAM 44. Thereafter, the output program employs a video transmitting unit 49 to convert the image in the frame memory 48 into a video signal, which it then transmits to the engine unit 61.

While the explanation order is inverted, the RAM includes the receiving buffer 47, the frame memory 48, which is a sheet image memory area for one page, and a work area.

The work area is used by the receiving program, the command analyzing program, the output program, the program file/data file receiving program and the photograph data printing program.

The operation of the program file/data file receiving program will be described later in detail; however, the function of the photograph data printing program is the printing the photograph data 54 stored in the external storage device 51.

An Internet connection unit 46 is used to connect, via the Internet, the program file/data file receiving program to the web server 1, which belongs to an entity such as a photograph agency or a music agency.

A panel 50 is employed by a user to instruct the printing of photograph data that is stored in the external storage device 51. Specifically, the external

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The thick arrows in Fig. 9 indicate the transmission of print command data or page image data,

the transmission of a video signal, and the conveyance of a sheet through the engine unit 61. The narrow arrows indicate the transfer of control among parts. The CPU 42 of the controller 41 and the CPU 62 of the engine unit 61 also exchange data. The information to be exchanged is that required to control the timing of the printing process, such as the transfer of a video signal and the feeding of a sheet.

When an instruction to purchase photograph data or music data is received from the user's personal computer 2, first, this instruction is stored, as is normal print command data, in the receiving buffer 47 via the network connection unit 45. The command analyzing program then analyzes the received command, and when it is ascertained that the instruction is for the purchase of photograph data or music data, the program file/data file receiving program is activated to handle the following process. The operation of the program file/data file receiving program will be described in detail later, while referring to the flowchart in Fig. 13.

When the user has employed the user's personal computer 2 to issue a photograph data printing instruction, without using the panel 50, first, this instruction is stored, as is the normal print command data, in the receiving buffer 47 via the network connection unit 45. The command analyzing program then

analyzes the received command, and when it is  
ascertained that the instruction is for the printing of  
photograph data, the photograph data printing program  
is instructed to perform the following printing  
5 process. The operation of the photograph data printing  
program will be described in detail later, while  
referring to the flowchart in Fig. 14.

The operation of the information processing system  
according to the second embodiment of the present  
10 invention will now be described while referring to the  
flowcharts.

Fig. 10 is a flowchart for explaining the  
operation of the photograph data/music data purchase  
instruction program stored in the user's personal  
15 computer 2. This program is activated by a user to  
purchase photograph data or music data.

First, at step S41, the URL of the web server 1,  
belonging to a photograph agency or a music agency,  
i.e., a homepage address on the Internet, is entered,  
20 at step S42, the number provided for the photograph  
data or music data to be purchased is entered, at step  
S43, a credit card number is entered, and finally, at  
step S44, the printer 3 is instructed to purchase  
photograph data or music data.

25 At this time, the printer 3 also receives the URL  
of the web server 1, the number provided for the data  
to be purchased and the credit card number, all of

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The operation of this program is thereafter terminated.

5 browser 71 of the user's personal computer 2 may be  
disconnected from the web server 1.

Fig. 11 is a flowchart for explaining the processing performed by the photograph display application 52 of the user's personal computer 2. This program is activated upon the receipt of an instruction from a user.

First, at step S51 the list of the titles of photograph data files 54 stored in the external storage device 51 of the printer 3 is displayed, and at step 15 S52, a check is performed to determine whether the user has issued an end instruction. If the decision is YES, the program is terminated. If the decision is NO, at step S53 a check is performed to determine whether the user has issued a photograph data file display 20 instruction. If the decision is YES, at step S54 a check is performed to determine whether that data file is one that includes a life counter. When the decision is YES, at step S55, the encrypted life counter is decrypted, the value held by the life counter is used 25 to set a variable n, and the variable n is decremented by one. Then, at step S56, a check is performed to determine whether the variable n is equal to or greater

than 0. When the decision is NO, without performing any further processing, program control returns to a position immediately preceding step S52 and loops while waiting for the next instruction to be issued by the user.

When the decision at step S56 is YES, at step S57 the variable n is encrypted and at step S58 the encrypted variable n is written in the photograph data file, and at step S59 the resultant data in the photograph data file is used for a display.

When the decision at step S54 is NO, program control jumps to step S59 and a simple photograph data process is performed.

Following step S59, program control returns to a position immediately preceding step S52 and loops while waiting for the next instruction to be issued by the user.

When the decision at step S53 is NO, at step S60 a check is performed to determine whether the user has issued a photograph data printing instruction. If the decision is YES, at step S50 the printer 3 is instructed to print the data in the photograph data file selected by the user.

After step S50, or when the decision at step S60 is NO, program control returns to a position immediately preceding step S52 and loops while waiting for the next instruction to be issued by the user.

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During this processing, the decrementing of the life counter has been performed before the display of the photograph data; however, the value of the life counter may be decremented after the photograph data has been normally displayed.

Fig. 12 is a flowchart for explaining the processing performed by the music reproduction application 53 of the user's personal computer 2. This program is activated upon the receipt of an instruction from a user.

First, at step S61 the list of the titles of music data files 55 stored in the external storage device 51 of the printer 3 is displayed, and at step S62, a check is performed to determine whether the user has issued an end instruction. If the decision is YES, the program is terminated. If the decision is NO, at step S63 a check is performed to determine whether the user has issued a music data file reproduction instruction. If the decision is YES, at step S64 a check is performed to determine whether that data file is one including a life counter. When the decision is YES, at step S65, the encrypted life counter is decrypted, the value of the life counter is used to set a variable n, and the variable n is decremented by one.

Then, at step S66, a check is performed to determine whether the variable n is equal to or greater than 0. When the decision is NO, without performing

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During this processing, the decrementing of the life counter has been performed before the reproduction

of the music data; however, the value of the life counter may be decremented after the music data has been normally reproduced.

Fig. 13 is a flowchart for explaining the operation of the program file/data file receiving program of the printer 3. This program is activated by a command analyzing program when the printer 3 receives, from the user's personal computer 2, an instruction for the purchase of photograph data or music data.

First, at step S71, the printer 3 is connected via the Internet to the web server 1, which is owned by a photograph agency or a music agency, and at step S72, the printer 3 notifies the web server 1 of the credit card number of the user and requests that the web server 1 transmit a photograph data file 54 or a music data file 55.

At step S73, the program loops while waiting for a photograph data file 54 or a music data file 55 to arrive. When the photograph data file 54 or the music data file 55 is received, at step S74, that data file is stored in the external storage device 51. Since the life counter is received at the same time, the life counter is encrypted and the encrypted life counter is written in the data file 54 or 55.

At step S75, the external storage device 51 is examined to find the photograph display application

program file 52, or the music reproduction application  
program file 53. When, at step S76, the search result  
is YES, at step S77 the user's personal computer 2 is  
notified that the reception of the data file 54 or 55  
5 has been completed, and the processing of this program  
is terminated.

When the decision at step S76 is NO, i.e., when  
the photograph display application program file 52 or  
the music reproduction application program file 53 is  
10 not present, at step S78 the web server 1 is requested  
to transmit the pertinent program file. At step S79  
the program loops while waiting for the program file 52  
or 53 to arrive. When the program file 52 or 53 is  
received, at step S80 the received program file is  
15 stored in the external storage device 51. Then, at  
step S81, the user's personal computer 2 is notified of  
the receipt of the data file 54 or 55 and the program  
file 52 or 53, and the processing of the program is  
terminated.

20 When the transmission of the photograph data file  
54 is requested at step S72, at step S78 the  
transmission of the photograph display application  
program file 52 is requested. Whereas if the  
transmission of the music data file 55 is requested at  
25 step S72, at step S78 the transmission of the music  
reproduction application program file 53 is requested.

Fig. 14 is a flowchart for explaining the

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operation of the photograph data printing program of the printer 3. This program is activated at the same time as the printer 3 is powered on.

First, at step S91 a check is performed to  
5 determine whether the user powered off the printer 3.  
If the decision is YES, the processing is terminated.

When the decision is NO, at step S92 a check is performed to determine whether the user has issued an instruction at the panel 50 to display the titles of photograph data files 54 that are stored in the external storage device 51. When the decision is YES, at step S93 a list of the titles of photograph data files 54 is displayed on the panel 50. Thereafter, program control returns to a position immediately preceding step S91 and loops while waiting for the next instruction to be issued by the user.

When the decision at step S92 is NO, at step S94 a check is performed to determine whether the user has issued an instruction to print the data for the photograph data file 54. The printing instruction may be issued by using the panel 50 of the printer 3, or by using the photograph display application 52 that is currently being operated by the user's personal computer 2.

25           If the decision at step S94 is NO, program control  
returns to a position immediately preceding step S91  
and loops while waiting for the next instruction to be

issued by the user.

When the decision at step S94 is YES, at step S95, the encrypted life counter, which is written in the photograph data file 54, is decrypted, at step S96 the value of the life counter is used to set a variable n, and at step S97, the variable n is decremented by a value equivalent to the number of copies instructed by the user.

Then, at step S98 a check is performed to determine whether the variable n is equal to or greater than 0. If the decision is NO, at step S103 an error message is displayed, and then, without performing any further process, program control returns to a position immediately preceding step S91 and loops while waiting for the next instruction to be issued by the user.

When the decision at step S97 is YES, at step S99 the variable n is encrypted, at step S100 the encrypted variable n is written in the photograph data file 54, and at step S101 the printing of the number of photograph data file 54 copies instructed is initiated. Then, at step S102 program control loops while waiting for the printing to be completed. When the printing has been completed, program control returns to a position immediately preceding step S91 and loops while waiting for the next instruction to be issued by the user.

<Effects in the second embodiment>

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In the second embodiment, the printer receives content data, such as photograph data or music data, via the Internet, and stores the data in the external storage device of the printer. Thus, a user can not  
5 directly read and copy the data using the file manager. That is, since the content data is stored only in the external storage device of the printer, unauthorized copying is prevented.

Only a special photograph display application or  
10 music reproduction application can read the photograph data or music data stored in the external storage device of the printer and can display a photograph or reproduce music. Also, with this arrangement the probability that unauthorized copies will be made by  
15 users is reduced.

The photograph display application can also instruct the printing of photograph data. Further, during the printing process, as during the display process, the value held by the life counter is  
20 decremented by one each time printing is performed. That is, since the value held by the life counter is decremented regardless of whether the photograph data is displayed or printed, a photograph agency can set a low price for photograph data, while taking printing  
25 into account.

In this embodiment, the printer receives, via the Internet, the photograph display application program

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file or the music reproduction application program file together with a photograph data file or a music data file. Therefore, the labor required of a user when acquiring a program file, by having to engage in a separate operation on the Internet, can be eliminated.

<Third Embodiment>

In the second embodiment, when the printer receives photograph data or music data from a web server, belonging to a photograph agency or a music agency, to which it is connected, the received data file is stored unchanged in the external storage device.

In a third embodiment, before photograph data or music data are stored in the external storage device of the printer they are encrypted. With this arrangement, the theft of photograph data or music data from the printer can be prevented.

It should be noted that before a photograph data application displays photograph data or a music reproduction application reproduces music data, a decrypting process is performed for the encrypted photograph data or music data.

<Fourth Embodiment>

In the second embodiment, the printer having the Internet connection function is employed as a peripheral device connected to the user's personal computer. In a fourth embodiment, instead of a

printer, a LAN server or another network device having  
an Internet connection function or, more broadly, a  
communication device may be employed. For this  
purpose, a handy telephone is considered to be a  
5 communication device.

Actually, any device can be employed so long as it  
has a function for preventing a third party from  
performing the unauthorized copying of digital content  
data, such as photograph data or music data, that are  
10 received and stored.

The above embodiments will now be summarized. In  
the first embodiment, first, a life counter is added to  
a digital data file, such as a photograph data file or  
a music data file, that is to be distributed to the  
15 user. This life counter is correlated with the  
frequency of the display of photograph data or the  
reproduction of music data. And each time a photograph  
display application or a music reproduction application  
in a user's personal computer displays photograph data  
20 or reproduces music data, a value held by the life  
counter is decremented a specific amount.

When the value held by the life counter has been  
reduced to a value smaller than a predetermined value,  
the display of photograph data or the reproduction of  
25 music data is inhibited.

Further, when the file manager of a user's  
personal computer is to copy a digital data file, such

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as a photograph data file or a music data file, the life counters of the source file that is copied and the destination file are each reduced by half, so that the total value held by the life counters is unchanged.

5 Therefore, even when a copy operation is performed, the total number of times photograph data can be displayed, or the total number of times music data can be reproduced is unchanged.

10 Furthermore, since the life counter is encrypted and the encrypted life counter is embedded in the data in a digital data file, such as a photograph data file or a music data file, the user can not alter the file and increase the value held by the life counter.

15 In the above explanation, the life counter is determined in correlation with the display frequency or the reproduction frequency; however, when the digital content data is music or video data, the value held by the life counter may be determined in correlation with the music reproduction time or the video reproduction  
20 time.

Assume that the value held by the life counter of a digital data file is decremented by the value equivalent to the time the data were reproduced by the user's personal computer, and that, if the value held  
25 by the life counter is reduced to 0, data reproduction is inhibited.

In this case, when a file is copied, the values

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held by the life counters of the source file that is copied and the destination file are reduced to half a value, as is described above.

In the thus arranged first embodiment, since a  
5 life counter is added to digital content data, such as  
photograph data or music data, the frequency of the  
display or reproduction can be limited. Further, since  
the value held by a life counter is equally divided  
during a copy operation while a frequency of display or  
10 reproduction limit is maintained, the digital content  
data, such as photograph data or music data, can be  
sold at a lower price via the Internet.

In the first embodiment, the decrementing function  
performed for the life counter is provided for the  
15 photograph display application and the music  
reproduction application in the user's personal  
computer. Further, the file manager of the user's  
personal computer is in charge of the file copying  
operation, and decrements the value held by the life  
20 counter during a copying operation.

However, the file manager belongs to the operating  
system (hereinafter referred to as the OS) of the  
personal computer, and is not a program that is easily  
supplied by a maker other than the software maker of  
25 the pertinent OS. Further, if a user creates a program  
tool that will simply copying any file, a digital data  
file can be directly copied without the value held by a

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life counter being decremented. Thus, security is not easily provided for the arrangement of the first embodiment.

Thus, in the second embodiment, a peripheral  
5 device, such as a color printer, that is attached to the user's personal computer and that has an Internet connection function is connected via the Internet to the web server of a photograph agency or a music  
10 agency, and receives and encrypts digital content files, such as photograph data files or music data files, and stores the encrypted data in an external storage device, such as a hard disk attached to the color printer.

At the same time, the color printer receives a  
15 life counter, and adds the encrypted life counter to a digital file on its attached hard disk.

A photograph display application or a music reproduction application is also received via the Internet from the web server of the photograph agency  
20 or the music agency, and is stored in the external storage device of the color printer.

By the way, the user's personal computer and color printer are connected via the network, and so on. The user's personal computer sends to the color printer an  
25 instruction to instruct which digital content data is received and stored. After storing the data file by the color printer, the user's personal computer copies

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an application program file, such as display  
application of photograph data or music reproduction  
application from the hard disc of the color printer.  
The external storage device of the user's personal  
5 computer stores the application program file.

The application program file, the photograph  
display application or music reproduction application,  
is stored in the external storage device of the color  
printer in a form that is visible from outside the  
10 printer and can be read, i.e., can be copied. However,  
the form of the digital data file is such that it is  
not visible outside of the color printer, i.e., the  
data file can not be copied.

When the photograph display application or the  
15 music reproduction application is activated in the  
user's personal computer, the photograph data file or  
music data file held by the color printer can be viewed  
by scanning the menu supplied by the application, and  
the display or reproduction of data can be performed.  
20 However, the photograph display application or the  
music reproduction application has only a display or a  
function, and does not have a save function, such as a  
"save as" function, so that simple copying is  
difficult. It should be noted, however, that the  
25 display application may include a printing function.

The second embodiment, therefore, differs from the  
first embodiment in that a special function is not

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required for the file manager, which is a part of the OS of the user's personal computer.

In the above description, the photograph display application program file or the music reproduction application program file is received from the web server of the photograph agency or the music agency. However, before a color printer is shipped, a printer maker may store the program file on the hard disk of the color printer. In this case, the photograph display application or the music reproduction application program should be prepared, by a detailed data format specification being established between the photograph agency or the music agency and the printer maker.

In the second embodiment, with the above described arrangement, a peripheral device, such as a color printer, that is attached to the user's personal computer is connected via the Internet to the web server, of the photograph agency or the music agency, receives digital data to which it adds a life counter, and stores the data in an external storage device. These digital data files are visible only to a photograph display application or a music reproduction application that has been specially prepared, and a copy process can not be used to extract then from the color printer.

Therefore, in the second embodiment, a more

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practical copy inhibiting form is provided than is available with the first embodiment, and the data display or reproduction frequency is restricted by adding a life counter to digital content data, such as photograph data or music data. Thus, the digital content data can be offered for sale at a lower price via the Internet.

In the second embodiment, a color printer having an Internet connection function is employed as a peripheral device connected to a user's personal computer. But instead of a color printer, a LAN server or other network device may be employed so long as it has an Internet connection function.

The scope of the invention also includes a mode whereby software program code for implementing the functions of the embodiments is supplied to a system or an apparatus (or a CPU or a MPU), and is operated in accordance with a program stored in the system or the apparatus.

In this case, the software program code implements the functions of the embodiments, and the program code itself, and means for supplying the program code to a computer, e.g., a storage medium on which the program code is stored, constitute the present invention. The storage medium used for supplying such program code can be, for example, a floppy disk, a hard disk, an optical disk, a magneto-optical disk, a CD-ROM, a magnetic

tape, a nonvolatile memory card, or a ROM.

The above embodiments are merely examples employed to explain the implementation of the present invention, and it should be understood that the technical scope of the invention is not limited to the embodiments described herein. That is, the present invention can be employed for various applications, without departing from or compromising the spirit or the main feature of the invention.

As is described above, according to the present invention, the frequency of data display or data reproduction can be limited by adding a life counter to content data, such as photograph data or music data. And further, during a copy process, limits imposed on display, printing and reproduction frequencies can be maintained by equally dividing the value held by the life counter. As a result, the content data, comprising photograph data and or music data, can be sold at a lower price via the Internet.